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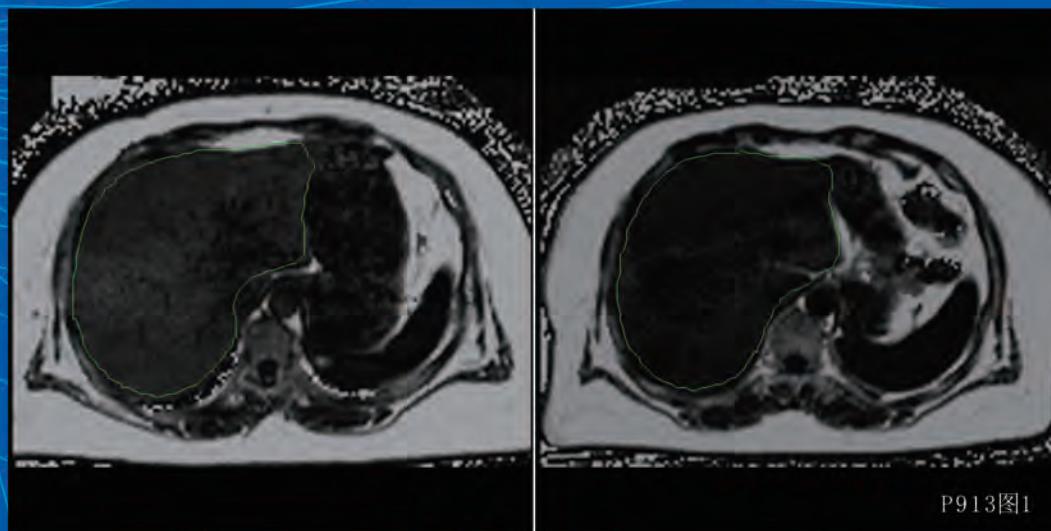
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# 磁共振成像

CIGONGZHEN CHENGXIANG

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## 封面文章

肥胖2型糖尿病(type 2 diabetes mellitus, T2DM)与肝脏脂肪沉积的发生有着密切的联系。脂肪的储存首先发生于皮下, 过度肥胖患者超过皮下脂肪最大存储能力而容易发生肝脏脂肪的异位沉积, 肝脏脂肪的过度积累与机体胰岛素抵抗的发生密切相关。肥胖和T2DM患者存在代谢异常协同作用可进一步加剧慢性并发症的发生发展, 比如可能导致非酒精性脂肪肝(nonalcoholic fatty liver disease, NAFLD)的发生, 从而引发非酒精性肝炎(nonalcoholic steatohepatitis, NASH)、肝硬化甚至肝细胞癌。因此, 定量评估和动态监测肝脏脂肪含量具有重要的临床意义。

肝脏组织活检是检测肝脏脂肪含量的金标准, 但是由于组织活检有创伤和容易受到抽样误差的影响限制其在临床上的应用。基于化学位移成像的磁共振回波Dixon技术被证实为一种无创、准确的检查方法来定量评估肝脏脂肪含量。本研究所使用的Multi-echo Dixon采用多个小角度翻转角、多达6次回波可以进一步解决先前Dixon技术脂肪和水的相位混淆所造成的影响, 实现对肝脏脂肪含量的准确定量, 并且具备扫描时间短、操作简单的优势, 全肝平均脂肪定量结果更是以清晰直观的彩虹报告图形式展示。

本研究通过对肥胖T2DM患者治疗前和治疗3个月后分别进行六回波Dixon快速肝脏脂肪定量扫描。此外, 采用手工在每一肝段勾画感兴趣(region of interest, ROI)的方式重新测量肝脏的平均脂肪含量, 比较上述两种方式测量结果之间的关联性和一致性。然后, 进一步深入分析肥胖T2DM患者治疗3个月后肝脏平均脂肪含量变化与自身体重、体质指数(body mass index, BMI)和糖化血红蛋白(HbA1c)变化之间的相关性。详见内文第910~915页。

本期支持单位: 中国科学院分子影像重点实验室、首都医科大学附属北京潞河医院

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## About the cover

The type 2 diabetes mellitus (T2DM) patient with obesity is closely related to the occurrence of liver fat deposition. The storage of fat firstly occurs under the subcutaneous. The T2DM patients with obesity exceed the maximum storage capacity of subcutaneous fat and are prone to ectopic deposition of liver fat. The excessive accumulation of liver fat is closely related to the occurrence of insulin resistance in the body. The synergistic effect of metabolic abnormalities in T2DM patients with obesity can further aggravate the development of chronic complications, such as the nonalcoholic fatty liver disease (NAFLD) that may lead to nonalcoholic steatohepatitis (NASH), cirrhosis and even hepatocellular carcinoma. Therefore, the quantitative assessment and dynamic monitoring of liver fat content have important clinical implications.

Liver biopsy is the golden standard of fat quantification. However, it is limited in the clinical application because the tissue biopsy is invasive and subject to the sampling error. The magnetic resonance multi-echo Dixon technique based on the chemical shift imaging has proven to be a non-invasive and accurate method for the quantitative assessment of liver fat content. The multi-echo Dixon used in our study has multiple small flip angles and up to 6 echoes. Thus, it could further resolve the problems of previous Dixon methods that the fat and water phase confusion enabling accurate quantification of liver fat content. Moreover, it has the advantage of short scanning time and simple operation. The mean value of fat quantification in the whole liver is displayed in a clear and intuitive rainbow report graph.

In this study, the rapid six-echo Dixon liver fat quantitative method was performed in the T2DM patients with obesity before and after 3 months treatment, respectively. Moreover, the mean value of fat quantification in the whole liver was re-measured by manually drawing the region of interest (ROI) in each liver segment. We analyzed the correlation and consistency between the quantitative results of the above two methods. Furthermore, we analyzed the correlation between the change in the liver fat content and the change in the body weight, body mass index (BMI) or HbA1c after the three months treatment. See text page 910-915.